spined embryos have made their way, or even when they are set free in the peritoneal cavity (in the wild rabbit), continue their metamorphoses *in situ*, and arrive at the adult sexual state without quitting the organism into which they penetrated as a microscopic ovum (only 0·030–0·070 millim. in diameter); only, in this case they furnish an unarmed *Tænia*. On the other hand, if the same vesicular worm is swallowed by a Carnivore or an Omnivore, it becomes, in the intestines of the latter, an armed *Tænia*; that is to say, it retains the hooks of the scolex from which it originates. In the former cases it loses them.

He adds that certain unarmed and armed *Tæniæ* are therefore two adult and parallel forms of the same worm; and the differences, often very great, which they present (as in the case of *Tænia perfoliata* of the horse, and *Tænia echinococcus* or *T. nana* of the dog, which originate from the same vesicular worm) are due exclusively to the difference of habitation and medium in which their final metamorphoses have been accomplished.—*Comptes Rendus*, January 13, 1879, p. 88.

On the Segmental Organs and Genital Glands of the Sedentary Polychætal Annelids. By M. L. C. E. Cosmovici.

Although many naturalists have paid attention to the organization of the Polychætal Annelids, it still remained to be ascertained in this group what is to be understood by the term *segmental organ*, and what is the nature of the organs of reproduction. Researches carried on for two years at Roscoff and at the Sorbonne, in the laboratories of experimental zoology of M. Lacaze-Duthiers, have led me to the following results.

The glandular sacs found in the interior of the body in these animals, and regarded by many authors as genital glands, were taken by Claparède, Keferstein, Ehlers, and others for segmental organs. Now their organization is more complex.

In a certain number of sedentary annelids, such as *Arenicola*, *Terebella nebulosa*, and others, these sacs are composed of two very distinct parts—one glandular, with very vascular walls, opening outwards by a special pore, and in the interior of which we detect, by means of reagents, a great number of crystals which appear to be formed of uric acid; this is incontestably a urinary organ or a *corpus Bojani*; the other part, which is not granular, is composed of a pavilion with two lips, more or less provided with very ciliate fringes, followed by a tube which is applied to the surface of the corresponding *corpus Bojani*. A communication exists between the two parts in the point of attachment; so that all bodies collected by the pavilion of one of these organs passes into the *corpus Bojani*, and is afterwards carried by the ciliary current towards the external opening. It is to the second part of these sacs that the name of *segmental organ* must be given.

The distinction between these two parts is observed with the utmost clearness in a great number of sedentary annelids. Thus in *Terebella conchilega* there are three pairs of these pouches which

are composed only of the glandular part, and which consequently have no communication with the interior of the cavity of the body; but further back we find two pairs of normally constructed segmental organs opening directly outwards by a pore. *Ophelia bicornis* presents a still more striking example. We find here five pairs of segmental organs placed on the sides of the nervous chain, followed by five other pairs of glandular pouches destitute of any communication with the interior. Lastly, the *Sabellæ* and the *Myxicolæ* have only one pair of renal pouches on the sides of the œsophagus, and in all the rest of the body each segment has its pair of segmental organs of the typical form. It must be added that the histological and chemical characters prove that these glandular sacs are really urinary organs, and that the segmental organs, sometimes borrowing from them, sometimes not, are perfectly independent parts, having no other function than that of collecting the products of generation in order to pour them out.

There is still much uncertainty with regard to the genital glands. My observations lead me to assert that in the sedentary annelids the ova and spermatozoids never originate either in the Bojanian sacs or in the epithelial cells of the peritoneum, nor are they derived from the nuclei surrounding the blood-vessels, nor even from the adipose tissue (sexual tissue of Claparède); but there exist very distinct glands in intimate connexion with the blood-vessels. Thus in *Arenicola piscatorum*, *Terebella conchilega*, and *Ophelia bicornis* the male or female genital gland is attached to the vessel which comes from the central part of the circulatory apparatus and runs to the segmental organs. The position varies in each of these genera; but the number is always equal to that of the pairs of segmental organs. In the *Terebellæ nebulosæ* the genital gland is on the median line around the supranervian blood-vessel, and only in the thoracic portion. In *Chætopterus pergamentaceus* the glands are situated in pairs in each segment and on the sides of the intestine. In the *Sabellæ*, again, they are placed in pairs in each segment, around the inferior lateral vessel.

These glands, during the period of repose (winter), consist of a certain number of small acini, the structure of which presents nothing very distinct. Towards the commencement of the spring the glands enter into activity, with differences according to the genera. The amorphous mass increases; each acinus becomes more and more defined; and in its interior we see small nuclei appear, around which a portion of protoplasm soon becomes limited. The ova are soon marked out, and at the same time they are displaced by fresh quantities of protoplasm developed at the base of the acinus. The gland acquires the form of a bunch of grapes; and the most mature ova arrive at the periphery, the youngest remaining at the base. The vitellus gradually becomes granular; and the germinal vesicle shows itself. Finally the ovum is detached and falls into the cavity of the body.

The same thing is observed in the case of the testes. The spermatic mother cells detach themselves from the glands; then their

walls dissolve, and their mulberry-like contents float for some time in the fluid of the cavity, after which the spermatozoids, hitherto united by their heads, separate and become free.

Oviposition takes place at different periods, according to the genera and species, and it is effected through the segmental organs. —*Comptes Rendus*, February 24, 1879, p. 393.

On Gloidium quadrifidum, *a new Genus of the Group Protista.* By M. N. Sobokin.

This new type of the Protista has been found at Kasan in a fresh-water aquarium. It consists of a small mass of protoplasm, about 0·03 millim. in diameter, of a more or less spherical form, and without an enveloping membrane. It exhibits a clear and transparent ectosarc, an endosarc containing reddish and yellowish granules of different sizes, and a contractile vesicle occupying a variable position, but usually situated in the ectosarc. There is generally a lapse of three or four minutes between the first appearance and the disappearance of this vesicle.

The changes of form of the outline of this creature are slow; and it only emits short processes having a slight tendency to bifurcate. A division which occurs in it begins to show itself in the ectosarc; but before it has had time to become well-marked, there appears a second constriction, perpendicular to the first, so that the mass soon forms four parts, only attached to one another by slender peduncles united in the middle, and which finally separate completely. The contractile vesicle, which had at first withdrawn to the middle of the body, afterwards reappears in each of the four new individuals.

Under the influence of conditions which are still unknown, this Protiston undergoes an encystment. The outer layer of the ectosarc gives origin to a thin but resistant membrane; then, within this first envelope, other similar, more or less distinct layers successively make their appearance. Upon one point of the envelope of the cytode thus formed there is a funnel-shaped canal, which is closed at the outer surface only by the first membrane of the cyst. The protoplasm of the *Gloidium* soon passes into this canal, ruptures the membrane which closes it, and passes outside. The organism which is thus set free is usually smaller than before the encystment. Multiplication by division takes place afresh, either immediately or after two or three successive encystments.

Gloidium is distinguished from the true Amœbæ by the absence of a nucleus, and from the Monera by the existence of a contractile vesicle, and (except the Lepomonera) by its faculty of encystment.

However, as passages exist between the Amœbæ and the Monera, the most striking character which distinguishes this new form is the quaternary division. In the *Vampyrellæ*, indeed, a similar division is observed; but it is effected during the encystment, while here it takes place in the free phase.—*Morphologisches Jahrbuch*, vol. iv. 1878, p. 398; *Bibl. Univ.* March 15, 1879, *Arch. des Sci.* p. 287.